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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,092	03/30/2007	Antonio Adigrat	10175.0004	8919

22852 7590 08/17/2009

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EXAMINER	
SNELTING, ERIN LYNN	
ART UNIT	PAPER NUMBER
1791	

MAIL DATE	DELIVERY MODE
08/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,092	ADIGRAT ET AL.	
	Examiner	Art Unit	
	Erin Snelting	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06-22-06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 24 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. It appears claim 24 may be intended to depend on claim 23, rather than claim 22, as currently written.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 15, 21, 22, 24, 25, 26, and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 15 line 3, Claim 25 line 2, and Claim 26 line 2 each recite "the glass core preform". This is unclear because claim 14 (upon which claim each claim is dependent) does not require the preform to be a *glass* core preform during the step of reducing the diameter of the central hole, only that the diameter reduction step is part of the drying and consolidating step. Thus, the preform at this stage could still be a *soot* core preform that has not yet been consolidated, or a *partially consolidated* preform. Claims 21, 22, and 24 are rejected by their dependence on claim 15.

5. Claim 28 recites the limitation "the central hole glass" in line 2. There is insufficient antecedent basis for this limitation in the claim. This is additionally unclear similarly to the claims above, wherein the central hole is not recited as comprising glass before the step of drying in claim 20 (upon which claim 28 is dependent), but as soot.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 14, 15, 19, 21, 22, 24, and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Berkey ‘278 (US Patent Application Publication 2003/0024278 A1).

8. Regarding claim 14, Berkey ‘278 teaches:

a. producing a soot core preform by chemical deposition on a substrate (“The porous body may be formed…by depositing layers of soot onto a bait rod via an outside deposition (‘OVD’) process”, paragraph [0081])

b. removing the substrate from the soot core preform, thereby forming a central hole along the soot preform (“mandrel 50 is removed from soot core blank 58. Upon removal of mandrel 50, soot core blank 58 defines an axially extending void or centerline aperture 60”, paragraph [0082])

c. drying ("soot preform 5 is preferably chemically dried", paragraph [0084]) and consolidating the soot core preform to form a glass core preform ("the soot preform 58…can be consolidated into a glassy preform", paragraph [0087])

d. stretching the glass core preform ("redrawing of the preform 10...drawing of the preform 100", paragraph [0112])

e. the step of drying and consolidating comprises reducing the diameter of the central hole ("centerline aperture 60 is evacuated to reduce the pressure therein…sufficient to only partially close or contract the inside diameter of the preform 100 wherever the preform is at a first temperature sufficient to radially close the centerline aperture 60 thereat", paragraph [0093]; "the preform 100 may be a soot preform 58, or a preform 58 which comprises both consolidated glass and silica-based soot…the preform 100, or glassy preform 55, may have just been consolidated in the same furnace", paragraph [0104])

f. the step of stretching comprises closing the central hole ("The centerline aperture 60 is preferably fully closed...during, redrawing of the preform 10...or the drawing of the preform 100", paragraph [0112]).

9. Regarding claim 15, Berkey '278 further teaches the step of reducing the diameter of the central hole comprises:

a. reducing the pressure inside the central hole ("The pressure in the centerline aperture 60 is reduced…sufficient to only partially close ore contract the inside diameter of the preform 100…", paragraph [0093])

b. subjecting the glass core preform to a temperature sufficient to soften glass ("…wherever the preform is at a first temperature sufficient to radially close the centerline aperture 60 thereat", paragraph [0093]; "the temperature of that part of the perform is sufficiently high wherein that part of the preform is soft enough to enable the centerline aperture 60 in that region to contract", paragraph [0099]).

10. Regarding claim 19, Berkey '278 further teaches:

a. the step of drying and consolidating is performed in a furnace ("soot core preform 58 is preferably chemically dried…within a consolidation furnace 64…Following the chemical drying step, the temperature of the furnace is elevated to a temperature sufficient to consolidate the soot into a consolidated perform", paragraph [0084])

b. drying the soot core preform at a first temperature ("Following the chemical drying step, the temperature of the furnace is elevated to a temperature sufficient to consolidate the soot into a consolidated perform", paragraph [0084])

c. consolidating the de-hydrated soot core preform at a second temperature higher than the first temperature ("Following the chemical drying step, the temperature of the furnace is elevated to a temperature sufficient to consolidate the soot into a consolidated perform", paragraph [0084]; "Typically, consolidation temperatures…lie in the range of 1400°C. to 1600°C", paragraph [0086])

d. subjecting the consolidated perform to a third temperature higher than the second temperature for reducing said diameter ("heating the perform…to a

temperature between 1900°C. and…2100°C…wherein the centerline aperture…fully collapses upon itself", paragraph [0132] – Examiner notes that collapsing the aperture constitutes reducing the diameter of the central hole).

11. Regarding claims 21, 22, and 24, Berkey '278 further teaches the pressure is reduced to at most 200 mBar, and at most 100 mBar ("the first pressure is less than about 10 Torr", page 12, claim 7 – wherein 10 Torr = 13 mBar).

12. Regarding claim 26, Berkey '278 further teaches reducing the diameter of the central hole comprises subjecting the glass core preform to a temperature sufficient to soften glass for 1 hour to 3 hours ("the temperature of that part of the perform is sufficiently high wherein that part of the preform is soft enough to enable the centerline aperture 60 in that region to contract", paragraph [0099]; "a consolidated preform is…exposed to a preferably isothermal heat zone which raises the temperature of the preform…for a period of between 2 hours and 10 hours", paragraph [0132]; "consolidated preform...was raised to a temperature...for about 2 hours", paragraph [0137]).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claim 25 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Berkey ‘278 (US Patent Application Publication 2003/0024278 A1).

16. Regarding claim 25, Berkey ‘278 further teaches reducing the diameter of the central hole comprises subjecting the glass core preform to a temperature of about 1495°C to about 1540°C ("a consolidated preform is disposed within a furnace such that the entire preform, is exposed to a preferably isothermal heat zone which raises the temperature of the preform to...between 1420°C and 1550°C…until the inside diameter of the perform defining the centerline aperture is reduced but not fully collapsed upon itself", paragraph [0132]; “the consolidated preform…was raised to a temperature of 1500-1550°C” paragraph [0137] – wherein the value of 1500°C constitutes a specific embodiment within the claimed range).

In the alternative, the ranges taught by Berkey '278 overlap the claimed ranges, and it is considered that it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the temperature for the benefit of creating the desired amount of softening of the preform for a particular soot/glass composition (“the

skilled artisan could readily determine the temperature(s) applicable to a soot preform of a particular composition", paragraph [0086]).

17. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey '278 (US Patent Application Publication 2003/0024278 A1) in view of Cavender, Jr. '383 (US Patent No. 4,684,383).

18. Regarding claims 16 and 17, Berkey '278 teaches that the diameter of the central hole at the end of the drying and consolidating step is a result of processing parameters such as temperature and pressure ("the pressure in the aperture is varied as a function of the diameter of the aperture", paragraph [0040]; see also paragraph [0107]; "The magnitude of the vacuum level(s) and the temperature of the preform, among other factors, govern the rate at which the centerline aperture region shrinks and circularizes", paragraph [0119]). Berkey '278 also teaches that the diameter of the central hole may be progressively reduced before final collapse ("the aperture is fully collapsed after a plurality of steps of radially reducing the aperture without fully collapsing the aperture", paragraph [0030]). Berkey '278 also teaches that the diameter of the central hole affects the manner in which the hole finally collapses, such that a smaller diameter increases surface tension effects and reduces the level of vacuum required for collapse (see paragraphs [0114]-[0115]). Berkey '278 also teaches that progressive reduction in diameter of the central hole improves circularity and/or symmetry of the central hole, which reduces geometric perturbations in and improves performance of the final optical product (see paragraph [0116]). While Berkey '278 is silent regarding the specific

claimed diameters of the central hole at the end of the drying and consolidating step, Berkey '278 clearly discloses the central hole diameter as a result effective variable that may be altered by optimizing various processing parameters for the benefit of producing an improved final optical product. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980).

Additionally, Cavender '383 teaches that geometry of the central hole is a known parameter related to water, or OH^-, contamination in consolidated soot preforms for optical waveguides, which directly affects optical fiber attenuation:

- "the water or OH^- content of an optical waveguide fiber is one of the important parameters which determines a fiber's attenuation coefficient", column 1, lines 11-14
- "it is desirable to have a low water content along the centerline of the fiber", column 1, lines 20-21
- "During storage, water enters a blank both through its outer surface and through the surface of its centerline aperture…The water entering through the centerline aperture...can be extremely detrimental to the optical performance of the fiber…since this water ends up along the centerline of the finished fiber", column 4, lines 52-63
- "the blank's aperture was modeled as a semi-infinite medium…having a constant water concentration at its boundary", column 6, lines 49-51

- "From the calculated water distributions, an average water content in ppb for the core portion of the blank was calculated by summing the calculated water concentrations, **multiplying** that sum by both the grid spacing used in the numerical analysis technique and **by the circumference of the blank's aperture**, and **dividing by the cross-sectional area of the core portion** of the blank", (emphasis added) column 7, lines 22-28)

such that varying the diameter (and thus the circumference and cross-section) of the central hole directly affects the water content of the preform, which directly affects attenuation in the optical waveguide fiber produced from the preform. Thus, Cavender '383 also discloses the diameter of the central hole as a result effective variable that may be altered in order to produce an improved final optical product.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Berkey '278 by optimizing the diameter of the central hole, as taught by Berkey '278 and Cavender '383, for the benefit of producing an improved final optical product.

19. Claims 18, 20, 23, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey '278 (US Patent Application Publication 2003/0024278 A1).

20. Regarding claim 18, Berkey '278 teaches that the diameter of the central hole at the end of the drying and consolidating step is a result of processing parameters such as temperature and pressure ("the pressure in the aperture is varied as a function of the diameter of the aperture", paragraph [0040]; see also paragraph [0107]; "The magnitude

of the vacuum level(s) and the temperature of the preform, among other factors, govern the rate at which the centerline aperture region shrinks and circularizes", paragraph [0119]). Berkey '278 also teaches that the diameter of the central hole may be progressively reduced before final collapse ("the aperture is fully collapsed after a plurality of steps of radially reducing the aperture without fully collapsing the aperture", paragraph [0030]). Berkey '278 also teaches that the final diameter of the central hole affects the manner in which the hole finally collapses, such that a smaller diameter increases surface tension effects and reduces the level of vacuum required for collapse (see paragraphs [0114]-[0115]). Berkey '278 also teaches that progressive reduction in diameter of the central hole improves circularity and/or symmetry of the central hole, which reduces geometric perturbations in and improves performance of the final optical product (see paragraph [0116]). While Berkey '278 is silent regarding the specific claimed ratio of central hole diameter before and after the step of drying and consolidating, Berkey '278 clearly discloses this ratio as a result effective variable that may be optimized in order to produce an improved final optical product. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Berkey '278 by optimizing the ratio of the central hole diameter before and after the step of drying and consolidating for the benefit of producing an improved final optical product.

21. Regarding claim 20, Berkey '278 teaches drying the soot core preform, consolidating the soot core preform to form a consolidated core preform, and reducing the diameter of the central hole to a desired value as described for claim 14 above.

Berkey '278 further teaches drying and consolidating the soot core preform *in a furnace*, as described for claim 19, reducing the pressure in the central hole, as described for claim 15, and increasing the temperature to which the preform is exposed to a temperature sufficient to soften glass, as described for claim 15. Additionally, Berkey '278 teaches:

a. a furnace that comprises multiple zones that are controlled to various temperatures for various processing steps ("The consolidation furnace 64 may have one or more heat zones. Thus, for example, the soot preform 58 may preferably be vertically lowered into consolidation furnace 64, wherein one end or tip of the soot preform 58 encounters a heat zone. As a portion of the soot preform 58 becomes heated, at least part of soot preform reaches a consolidation temperature. Alternatively, the entire heated portion of the soot preform 58 may reach a consolidation temperature therethroughout", paragraph [0085]; "the furnace may be provided with additional hot zones such that the preform 58 can be advanced into the furnace sufficiently to be in proximity to one or more additional hot zones", paragraph [0101]; "a plurality of hot zones or heated zones may also correspond to a plurality of furnaces, whether arranges adjacent to, or in proximity to, each other", paragraph [0102]; "The preform 100 is preferably a previously consolidated glass preform 55 which may have been consolidated in the same furnace or a different furnace", paragraph [0104])

b. removing the consolidated core preform from the furnace ("the first step may occur in one location, e.g. at the consolidation furnace, and further hole

closure and/or full collapse may occur in a second location, e.g. in a holding oven or a redraw furnace", paragraph [0121])

for the benefit of manipulating the temperature of the preform as needed for various processing steps. ("A plurality of hot zones may be desirable, or necessary, in order to raise or maintain the temperature of the portion, or portions, of interest in the preform. The skilled artisan will recognize that factors such as the traverse rater of the preform, the dimensions and composition of the preform, the heat energy available from the hot zone, including the heat exchange with the surrounding environment within the furnace, may all contribute to the determination of either the desirability or the necessity of having more than one hot zone", paragraph [0108]). While Berkey '278 does not describe the exact movement of the preform between furnace zones as claimed, it is considered that it would have been obvious to one of ordinary skill in the art at the time of the invention to determine how to move the preform between furnace zones for the benefit of manipulating the temperature of the preform as needed for various processing steps.

22. Regarding claim 23, Berkey '278 further teaches the pressure is reduced to at most 200 mBar ("the first pressure is less than about 10 Torr", page 12, claim 7 – wherein 10 Torr = 13 mBar).

23. Regarding claim 27, Berkey '278 teaches a ratio between the core radius and the external radius of a consolidated preform of 0.14, which is lower than 0.4 as claimed ("The soot preform was consolidated and the inside diameter shrunk to about 7 mm while the outside diameter was greater than 50 mm", paragraph [0133] - wherein

3.5 / 25 = 0.14). While Berkey '278 is silent regarding the specific ratio of the core radius and external radius of the soot core preform (pre-consolidation), Berkey '278 does teach that as the core radius contracts, the external radius contracts as well ("…causing the inner surface (and inside diameter) of the preform to contract…The outer surface (and outside diameter) of the preform contracts as well", paragraph [0106]). It is considered, then, that it would have been obvious to one of ordinary skill in the art at the time of the invention that the ratio between the core radius and the external radius of the soot core preform would be close to that of the consolidated preform, which would be lower than 0.4, as claimed.

Additionally, Berkey '278 teaches that the ratio between the core radius and the external radius is a result effective variable because it may be altered in order to optimize vacuum forces needed and behavior of the preform during closure of the central hole, thereby reducing geometric perturbations in and improving performance of the final optical product ("If the ratio of the outside diameter of the preform is sufficiently large, forces can be generated, by reducing the outside diameter of the preform, which are sufficient to close the centerline aperture. Thus, if the outside diameter of the preform is sufficiently large, a hole within the preform can be closed during a diameter reduction operation, without having to utilize significant vacuum forces. In this way, circular and/or symmetric hole closure can be enhanced", paragraph [0128]). Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Berkey '278 by optimizing the ratio between the core radius and the external

radius for the benefit of optimizing vacuum forces needed and behavior of the preform during closure of the central hole, thereby reducing geometric perturbations in and improving performance of the final optical product.

24. Regarding claim 28, Berkey '278 further teaches:

a. fitting a low-melting temperature member ("Glass plug 66 is preferably made from a relatively low melting point glass", paragraph [0082]) to a lower end of the central hole glass before the step of drying ("Centerline aperture 60 located near distal end 61 of soot core blank 58 is preferably fitted with a glass bottom plug 66 prior to positioning porous body 58 within consolidation furnace 64A", paragraph [0082]; "soot preform 58 is preferably chemically dried…within consolidation furnace 64", paragraph [0084])

b. reducing the pressure in the central hole comprises extracting gas from the central hole from an upper end thereof ("As seen if Fig. 6,…Negative pressure may be applied to interior cavity 71 of inner handle 76 and interior cavity 69 of integral handle 52", paragraph [0090]; "the centerline aperture 60 is evacuated to reduce the pressure therein...to only partially close or contract the centerline aperture 60", paragraph [0093]; see also paragraph [0107]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin Snelting whose telephone number is (571)272-7169. The examiner can normally be reached on Monday to Friday 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571)272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Carlos Lopez/
Primary Examiner, Art Unit 1791
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